

No.2667A

Monolithic Linear IC

**LA 4538 M**

Ripple Filter-Provided Stereo Power Amp  
for 1.5V Headphone Stereos

**Features**

- Low current dissipation
- Excellent reduced voltage characteristics
- Minimum number of external parts required
- On-chip power switch function
- Power amp section
  - Output power 8mW typ ( $V_{CC} = 1.5V, R_L = 16\Omega, f = 1kHz, THD = 10\%$ )
  - Ripple rejection 46dB typ ( $V_{CC} = 1.0V, V_R = -30dBm, f_R = 100Hz$ )
  - On-chip muting function
- Ripple filter section
  - Ripple rejection 39dB typ ( $V_{CC} = 1.0V, V_R = -35dBm, f_R = 100Hz$ )
  - Less output voltage loss
  - Pin 8 can be used to perform the muting function.

**Maximum Ratings at  $T_a = 25^\circ C$** 

			unit
Maximum Supply Voltage	$V_{CC}$ max	Quiescent	4.5 V
Maximum Output Current	$I_o$ 7	Pin 7 flow-out current	5.0 mA
Allowable Power Dissipation	$P_d$ max		300 mW
Operating Temperature	$T_{op}$		-20 to +75 °C
Storage Temperature	$T_{stg}$		-40 to +125 °C

**Operating Conditions at  $T_a = 25^\circ C$** 

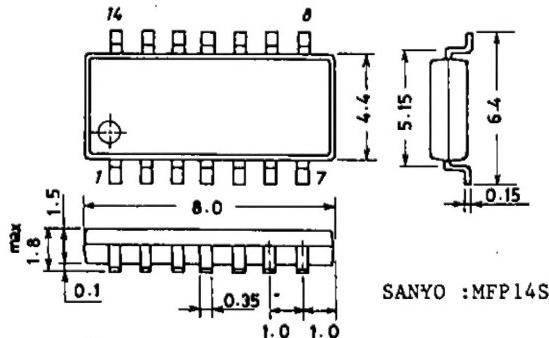
		unit
Recommended Operating Voltage	$V_{CC}$	1.5 V
Operating Voltage Range	$V_{CC}$ op	0.9 to 4.0 V
Recommended Load Resistance	$R_L$	16 to 32 Ω

**Operating Characteristics at  $T_a = 25^\circ C, R_L = 16\Omega, R_g = 600\Omega$ , See specified Test Circuit.**

			min	typ	max	unit
Quiescent Current	$I_{CC(1)}$	$V_{CC} = 1.20V$ , quiescent, $R_{L3} \rightarrow OFF$	4.5	7.0	mA	
	$I_{CC(2)}$	$V_{CC} = 2.50V$ , pin 14 → GND, $R_{L3} \rightarrow OFF$	1.5	2.5	mA	
	$I_{CC(3)}$	$V_{CC} = 2.50V$ , pin 1 → GND, $R_{L3} \rightarrow OFF$		1.0	μA	
Voltage Gain	$VG$	$V_{CC} = 0.90V, f = 1kHz, V_o = -20dBm$	27.5	29	31.5	dB
Voltage Gain Difference	$\Delta VG$	$V_{CC} = 0.90V, f = 1kHz, V_o = -20dBm$		1.0	1.0	dB
Total Harmonic Distortion	THD	$V_{CC} = 1.20V, f = 1kHz, P_o = 0.5mW$		0.9	1.5	%
Output Power	$P_o$	$V_{CC} = 1.50V, f = 1kHz, THD = 10\%$	5	8	mW	

Continued on next page.

**Package Dimensions 3111-M14SIC**  
(unit: mm)



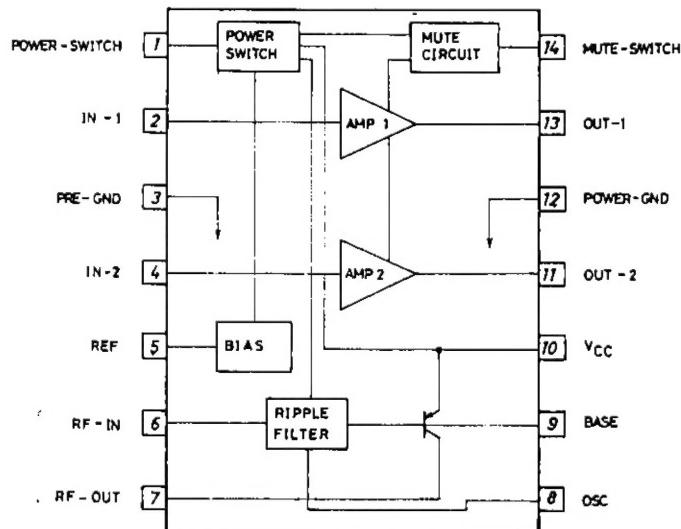
SANYO :MFP14S

**SANYO Electric Co., Ltd. Semiconductor Business Headquarters**  
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110 JAPAN

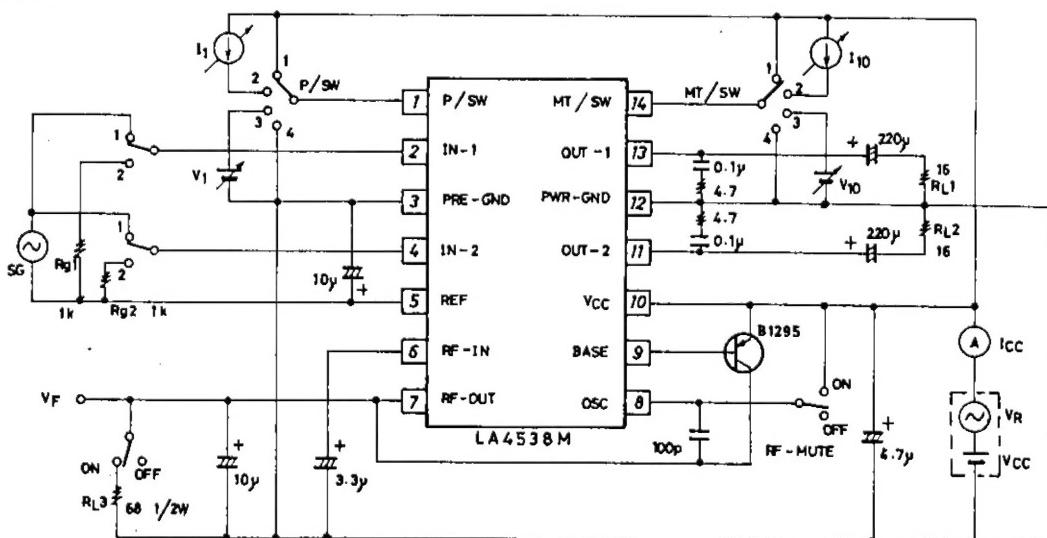
Continued from preceding page.

			min	typ	max	unit
Crosstalk	CT $V_{CC} = 1.20V, f = 100Hz, R_g = 1k\Omega, V_o = -20dBm$		40	45		dB
Ripple Rejection (Amp Section)	SVRR(1) $V_{CC} = 1.00V, f = 100Hz, R_g = 1k\Omega, V_R = -30dBm, BPF = 100Hz$	40	46			dB
Ripple Rejection (Filter Section)	SVRR(2) $V_{CC} = 1.00V, f = 100Hz, V_R = -35dBm$	34	39			dB
Output Noise Voltage	$V_{NO}$ $V_{CC} = 2.50V, R_g = 1k\Omega, BPF = 20Hz$ to 20kHz		55	80		$\mu V$
Power ON-State Current Sensitivity	$I_{1(ON)}$ $V_{CC} = 0.85V, V_{pin5} \geq 0.5V$		0.1	1.0		$\mu A$
Power OFF-State Voltage Sensitivity	$V_{1(OFF)}$ $V_{CC} = 0.85V, V_{pin5} \leq 0.1V$	0.5	0.6			V
Muting ON-State Current Sensitivity	$I_{14(ON)}$ $V_{CC} = 0.85V, V_{pin5} \geq 0.5V$		0.1	1.0		$\mu A$
Muting OFF-State Voltage Sensitivity	$V_{14(OFF)}$ $V_{CC} = 0.85V, V_{pin5} \leq 0.1V$	0.5	0.6			V
Ripple Filter Output Voltage	$V_F$ $V_{CC} = 1.00V, R_L = 68\Omega$	0.90	0.94			V

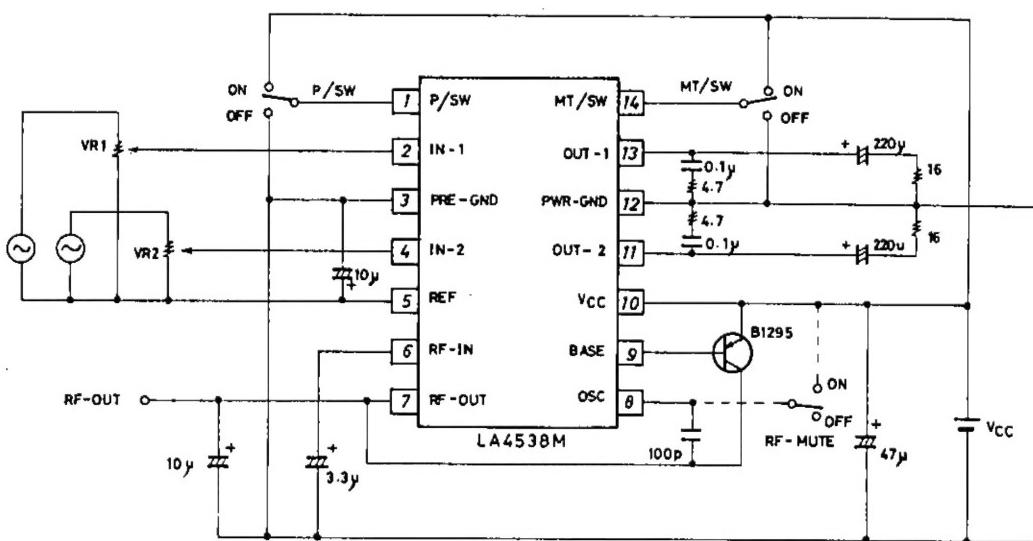
## Equivalent Circuit Block Diagram



## Test Circuit

Unit (resistance:  $\Omega$ , capacitance: F)

## Sample Application Circuit



Unit (resistance:  $\Omega$ , capacitance: F)

- No products described or contained herein are intended for use in surgical implants, life-support systems, aerospace equipment, nuclear power control systems, vehicles, disaster/crime-prevention equipment and the like, the failure of which may directly or indirectly cause injury, death or property loss.
- Anyone purchasing any products described or contained herein for an above-mentioned use shall:
  - ① Accept full responsibility and indemnify and defend SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors and all their officers and employees, jointly and severally, against any and all claims and litigation and all damages, cost and expenses associated with such use;
  - ② Not impose any responsibility for any fault or negligence which may be cited in any such claim or litigation on SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors or any of their officers and employees jointly or severally.
- Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.